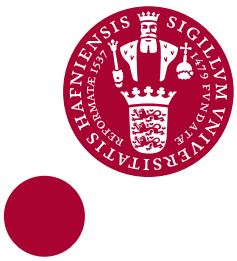

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# First record of *Plantago commersoniana* (Plantaginaceae), a rare and threatened species, in the Central-West region of Brazil

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**Abstract:** *Plantago commersoniana* is a rare and threatened species, with a highly disjunct distribution, mainly in southern Brazil. This study expands its distribution to Mato Grosso do Sul state, in the Central-West region of Brazil, due to the discovery of a collection of this species from rocky grasslands in Ponta Porã. This new record is ca. 285 km distant from the nearest known population, in Yhú, Caaguazú department, eastern Paraguay. This is also the first record of a native *Plantago* species in Mato Grosso do Sul. Its conservation status according to the IUCN criteria is Endangered (EN).

**Key words:** distribution extension; Neotropics; new record; rare species; South America

*Plantago* L. (Plantaginaceae) is a cosmopolitan genus with over 250 species, concentrated in temperate and high-elevation tropical regions (Pilger 1937; Rahn 1996; Rønsted et al. 2002). Together with its closest genera, *Littorella* P.J.Bergius (Hoggard et al. 2003) and *Aragoa* Kunth (Bello et al. 2002), *Plantago* is part of tribe Plantagineae (Albach et al. 2005) in the recently much enlarged Plantaginaceae (Olmstead et al. 2001). *Plantago* species are anemophilous herbs or rarely subshrubs, perennial or annual (Pilger 1937; Meudt 2012). Some *Plantago* species have wide geographic distributions, a few being cosmopolitan ruderals, like *P. major* L. (von Linné 1753: 112–113) and *P. lanceolata* L. (von Linné 1753: 113–114). However, most *Plantago* species have more restricted geographic distributions, some of these being extremely narrow endemics (Rahn 1996; Segarra and Wood 2011; Hassemer and Baumann 2014; Hassemer et al. 2014), including several species endemic to small oceanic islands (Dunbar-Co et al. 2008; Tay et al. 2010; Meudt 2012). Many *Plantago* species are well-known for their traditional medicinal uses and also for other interesting properties (Samuelsen 2000; Weryszko-Chmielewska et al. 2012).

*Plantago commersoniana* Decne. ex Barnéoud (Barnéoud 1845: 37) is a rare and threatened species, with a highly disjunct distribution (Figure 1), endemic to rock outcrops on grasslands ("lajeados", in Portuguese) from sea level up to 2,700 m a.s.l. (Rahn 1966, 1974). Because of these environmental requirements, this species can be considered an edaphic endemic species (Ferreira and Boldrini 2011). A few populations of *P. commersoniana* occur in the South region of Brazil, in addition to a single population in Serra do Caparaó (Southeast region of Brazil), another in eastern Paraguay, and a probably extinct population in southern Uruguay (Rahn 1966, 1974; Souza and Hassemer 2015). Hefler et al. (2011) affirm that this species occurs in Argentina, but no collection of *P. commersoniana* is known from that country.

During the revision of the entire *Plantago* collections at C, EFC, FLOR, FURB, HBR, ICN, MBM and UPCB herbaria, in addition to high-resolution images from ESA, G and IRAI, we found a collection of this species (*G.G. Hatschbach et al. 76667*, MBM) (Figure 2) from Ponta Porã, southern Mato Grosso do Sul state, Central-West region of Brazil. This is the first record of *P. commersoniana* in the Central-West region of Brazil, and is ca. 285 km distant from the nearest known population, in Yhú, Caaguazú department, eastern Paraguay. This is also the first record of a native *Plantago* species in Mato Grosso do Sul (Souza and Hassemer 2015), as only *P. major*, a non-native species in South America, was hitherto referred to this Brazilian state.

*Plantago commersoniana* are perennial herbs, with a taproot. Caudex growing vertically. Leaves linear to lanceolate, with variously-oriented trichomes, the abaxial surface usually with densely distributed, long, silky trichomes, the adaxial surface with sparsely distributed, shorter trichomes. Trichomes on leaves and scape usually long (2–5 mm) and always very thin, without conspicuous cellular articulations. Ovary with 1–3 ovules. Pyxidium 1–2-seeded. Synonyms of *P. commersoniana* include *P. bradei* Pilg. (Pilger 1949: 568)

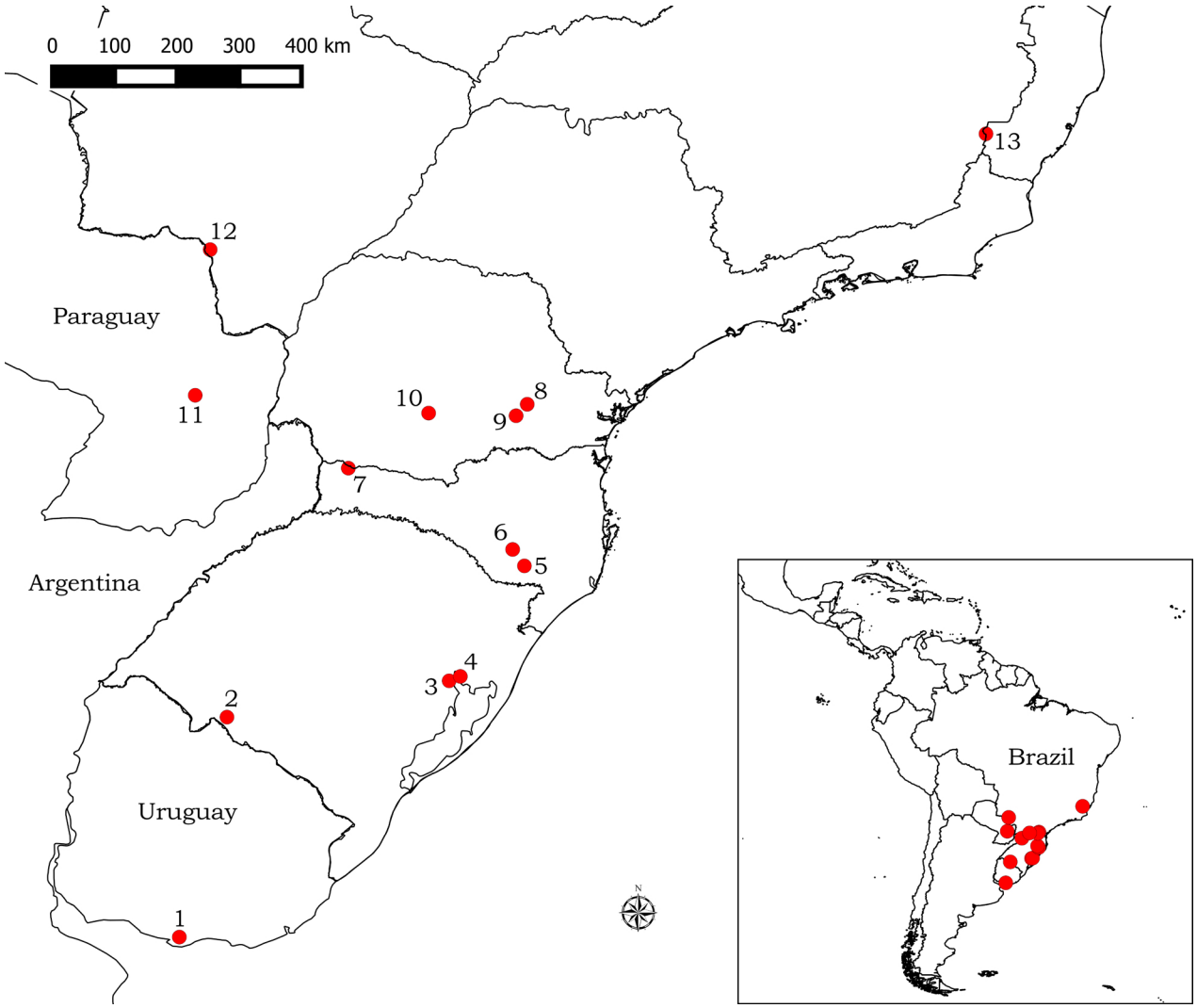


**Figure 1.** Distribution of the recorded populations of *Plantago commersoniana* (in parenthesis the date of the most recent collection, or observation by GH during field work). Current distribution may be more restricted, as later visits to some of these locations did not find this species. Legend: **1**: Montevideo, Uruguay (1767). **2**: Santana do Livramento, Brazil (1972). **3**: Guaíba, Brazil (1994). **4**: Porto Alegre, Brazil (2009). **5**: São Joaquim, Brazil (2015). **6**: Lages, Brazil (1963). **7**: Campo Erê, Brazil (1957). **8**: Ponta Grossa, Brazil (2015). **9**: Palmeira, Brazil (1997). **10**: Guarapuava, Brazil (1980). **11**: Yhú, Paraguay (1905). **12**: Ponta Porã, Brazil (2003). **13**: Serra do Caparaó, Brazil (2000).

and *P. selloi* J.A.Schmidt (Schmidt 1878: 171); the name *P. yhuensis* has been applied to the Paraguayan collection of this species (*Hassler 9471*, G), but it is a *nomen nudum*.

The discovery of a population of *Plantago commersoniana* in Mato Grosso do Sul does not improve the conservation situation of this species. *Plantago commersoniana* is a rare species, with a sparse and discontinuous distribution, and its few recorded populations are small and isolated (Rahn 1966, 1974). These populations are likely in decline due to the ongoing destruction of its habitats, which could be verified during recent field work conducted in some localities where this species has been collected in the past. It is probable that this species is already extinct in Uruguay, a hypothesis already pointed by Rahn (1966, 1974), who did not find other collections of this species from that country apart from the type, collected in 1767 around Montevideo, southern Uruguay. Additionally, *P. commersoniana* is absent from the recent floristic survey of the hilly grasslands of Porto Alegre (Setúbal et al. 2011), which is one of the recorded locations for this species (see Figure 1).

Recent (January 2015) field work conducted by GH in southern Brazil — Guaíba and Santana do Livramento municipalities in Rio Grande do Sul state, and Palmeira municipality in Paraná state — did not find any specimens of *P. commersoniana*. His observations during this field work give us reason to believe that some populations of this species are already extinguished, or could become so in a near future, due to the advance of agriculture and of invasive *Pinus* L. (Pinaceae) species, to the detriment of its rare and restricted habitats (Figure 3). Because of this, we stress that this species needs urgent conservation attention and efforts. Its conservation status according to the IUCN criteria (IUCN 2012, 2014) is Endangered (EN – B2a,b[i,ii,iii,iv,v]). It is necessary to


**Figure 2.** Scanned image of the collection of *Plantago commersoniana* (*G.G. Hatschbach et al. 76667*, MBM) from Ponta Porã, Mato Grosso do Sul state, Brazil.

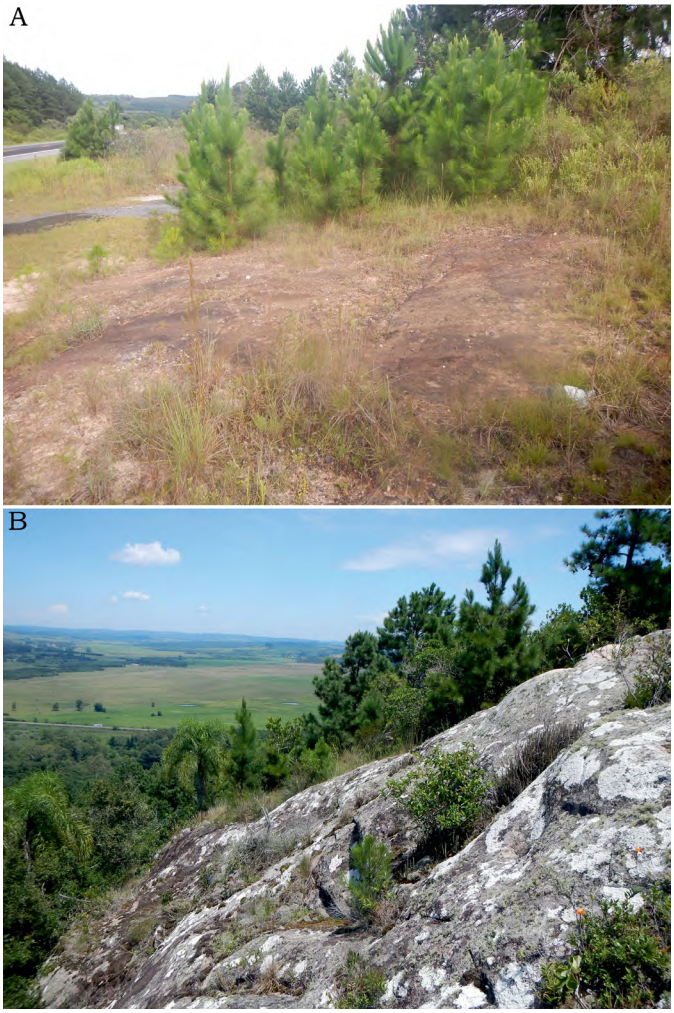


**Figure 3.** Habitats of *Plantago commersoniana* being invaded by *Pinus* sp., which kills the plants native to these areas by shading. Both areas were photographed by GH in 2015. **A**: Location of the only collection of *P. commersoniana* from Palmeira municipality, Paraná state, Brazil (collected by OSR in 1997). **B**: Location of the only collection of *P. commersoniana* from Guaíba municipality, Rio Grande do Sul state, Brazil (collected by Nelson Ivo Matzenbacher in 1994, who kindly helped GH to find this area).

correct the conservation status of *P. commersoniana* in the "Red List of the Brazilian Centre for the Conservation of the Flora" (Kutschenko and Messina 2012), where its conservation status has been assessed as Least Concern (LC). Additionally, *P. commersoniana* is absent from the "Red Book of the Flora of Brazil" (Martinelli and Moraes 2013).

In addition to serious conservation issues, *P. commersoniana* is also notable for its very complicated and unsatisfactorily resolved taxonomy, like many other *Plantago* species (Meudt 2011; Hassemer et al. 2015b; Shipunov 2015). This species is morphologically very variable between regions, especially regarding leaves and roots, and its distribution is highly disjunct. There is mostly a continuous variation for these characters, though, which makes it difficult their use for classification. In some localities, specimens of *P. guilleminiana* Decne. (Decaisne 1852: 722–723), a fairly frequent species, endemic to high-elevation grasslands in southern Brazil, exhibit some morphological characters similar to *P. commersoniana*. Following the judgement of Rahn (1974), all these doubtful collections are presently identified as *P. guilleminiana*. Therefore, we can consider the *P. commersoniana* complex an important challenge to plant taxonomy and conservation in the Neotropics, one of the world's most important hotspots of plant diversity (Antonelli and Sanmartín 2011; Hassemer et al. 2015a).

## MATERIAL EXAMINED

***Plantago commersoniana***—BRAZIL. Espírito Santo: Iúna: Parque Nacional do Caparaó, entre Arrozal e Morro do Tesouro, campo de altitude, 18 February 2000, *J.P. Souza et al. 3098* (ESA 64290, photograph, MBM 244533). Mato Grosso do Sul: Ponta Porã: Rodovia Ponta Porã–Bela Vista, próximo da fazenda Itamonte, campo limpo, seco e rochoso, 23 October 2003, *G.G. Hatschbach et al. 76667* (MBM 290928). Minas Gerais: Alto Caparaó: Parque Nacional do Caparaó, caminho entre Tronqueira (1,970 m) e o Pico da Bandeira (2,890 m), campo de altitude, 2 September 1996, *V.C. Souza et al. 12183* (ESA 37391, photograph); Parque Nacional do Caparaó, trilha para o Pico da Bandeira, próximo à casa de pedra, campo de altitude, 1,790–2,400 m, 12 February 1998, *J.P. Souza et al. 2131* (ESA 61835, photograph). Paraná: Guarapuava: Rio Campo Real, 21 October 1966, *J. Lindeman & H. Haas 2769* (MBM 9311); Lagoa Seca, campo pedregoso e úmido, 21 September 1968, *G.G. Hatschbach 19777* (C, MBM 8773, UPCB 10161); Canta Galo, campo pedregoso, 7 February 1969, *G.G. Hatschbach 21037* (C, MBM 16367); Rio Campo Real, campo pedregoso, 1 October 1980, *G.G. Hatschbach 43207* (MBM 67967); Palmeira: BR-277, descida para o Rio Capivara, campo limpo e seco, 5 July 1997, *O.S. Ribas & L.B.S. Pereira 1875* (MBM 238241); Ponta Grossa: Parque Vila Velha, Furnas, campo seco e limpo, 9 November 1966, *G.G. Hatschbach & P. Occhioni 15100* (C, HBR 35243, MBM 3630); Anfiteatro, campo limpo e seco, 27 September 1973, *G.G. Hatschbach 32592* (C, MBM 29123); Vila Velha, campo limpo e seco, 1 October 1988, *J.T.W. Motta 1437* (MBM 367566); Parque Estadual de Vila Velha, Fazenda Cambijou, campo seco, 1 November 2001, *S.M. Hefler et al. 67* (MBM 285063, UPCB 44868); Parque Estadual de Vila Velha, campo limpo e seco, 965 m, 29 December 2011, *R. Ristow et al. 2062* (IRAI 5275, photograph). Rio Grande do Sul: Guaíba: Fazenda São Maximiano, BR-116, km 307, 24 September 1994, *N.I. Matzenbacher s.n.* (ICN 103762); Porto Alegre: Vila Manresa para Porto Alegre, campo pedregoso, 2 October 1948, *B. Rambo 37798* (HBR 13825); Morro das Abertas, 3 November 2009, *R. Setúbal et al. 953* (ICN 164347); Santana do Livramento: Cerro Palomas, 25 November 1972, *E. Vianna et al. s.n.* (ICN 21026). Santa Catarina: Campo Erê: 6–24 km west of Campo Erê, rocky barren, 900–1,000 m, 20 February 1957, *L.B. Smith & R.M. Klein*

*11544* (HBR 31534); Lages: Morro do Pinheiro Seco, campo, 950 m, 15 September 1963, *R. Reitz & R.M. Klein 16317* (HBR 31091); São Joaquim: às margens da rodovia SC-440, lajeado, 1,138 m, 2 December 2012, *G. Hassemer et al. 648* (FLOR 47511). PARAGUAY. Caaguazú: in regione fluminis Yhú, in campis, September 1905, *E. Hassler 9471* (G, photograph). URUGUAY. Montevideo: 1767, *P. Commerson s.n.* (C, isotype).

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**Authors' contribution statement:** GH revised the herbarium collections, wrote the text, authored the photographs, produced the map and prepared the figures. OSR first identified the collection from Ponta Porã, and GH confirmed the identification. NR and OSR revised the text.

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